



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,192	12/20/2001	Gyanesh P. Khare		9714

7590

01/22/2003

RICHMOND, HITCHCOCK, FISH & DOLLAR  
P.O. Box 2443  
Bartlesville, OK 74005

EXAMINER

VANOY, TIMOTHY C

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 01/22/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10-027,192

Applicant(s)

KHARE

Examiner

VANOY

Group Art Unit

1754

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☐ Responsive to communication(s) filed on \_\_\_\_\_
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-54 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-54 is/are rejected.
- ☒ Claim(s) 32 is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
  - ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

Office Action Summary

## DETAILED ACTION

### *Claim Objections*

- o/a) Claim 32 is objected to because it sets forth that claim 17 is directed to a process. Claim 17 is directed to a composition.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 53 and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Pat. 4,634,515.

The gasoline and diesel of Applicants' claims 53 and 54 are not expected to be any different from the gasoline and/or diesel worked up from the desulfurized naptha that the process of U. S. Pat. 4,634,515 produces (please see col. 1 lns. 17-18 and claim 1 in U. S. Pat. 4,634,515), consistent with the discussion of the *In re Thorpe* 777 F.2d 695,698, 227 USPQ 964, 966 (Fed. Cir. 1985) court decision set forth in section 2113 in the MPEP (8<sup>th</sup> ed.).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1754

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having "ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being obvious over U. S. Pat. 5,726,117 in view of U. S. Pat. 4,634,515.

Example 1 in columns 5 and 6 in U. S. Pat. 5,726,117 describes what appears to be an obvious variation of the same sorbent made by:

- mixing calcium silicate with zinc oxide in a mix-muller;
- mixing the calcium silicate/zinc oxide mixture with an aqueous solution of alumina;
- drying and calcining the resulting wet paste at 635 oC for 1 hour;
- granulating the dried, calcined product to produce particles;
- mixing the particles with an aqueous solution of nickel nitrate so as to impregnate the particles with nickel nitrate;
- drying and calcining the nickel-impregnated particles 635 oC for 1 hour, and
- steam-treating the nickel-impregnated particles with steam-containing gas at 760 oC for 24 hours to produce what appears to be a steam-treated sorbent comprising zinc oxide and nickel oxide supported alumina, as set forth in at least Applicants' claims 1-6, 8, 12, 13 and 16.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claims 1, 3, 4, 6, 7, 8, 13 and 16 requires the presence of a "reduced valence" promoter (i. e. a promoter having a valence less than 2 or 0, such as (elemental or reduced) nickel).

U. S. Pat. 4,634,515 is directed to the same art of removing hydrogen sulfide out of a fluid via contact with a sorbent, however col. 5 lns. 4 and 5 reports that the sorbent has been subjected to a pre-reduction step at 700 to 800 oF (with hydrogen gas: please also see col. 6 ln. 36) and col. 7 lns. 10-20 reports that when the nickel is present in the

reduced or metallic state, there is improvement in the amount of sulfur sorbed by the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process for making the sorbent described in U. S. pat. 5,726,117 by including the hydrogen reduction step mentioned in col. 5 Ins. 4 and 5 and col. 6 line 36 in U. S. Pat. 4,634,515 so as to result in a sorbent having a "reduced valence" promoter, in the manner required in the scope of Applicants' claims 1, 3, 4, 6, 7, 8, 13 and 16, because of the taught advantage of increasing the amount of sulfur sorbed by the sorbent with the promoter in a chemically "reduced valence" state, as taught in col. 7 lines 10-20 in U. S. Pat. 4,634,515.

While Example 1 in U. S. Patent 5,726,117 does not set forth what the weight percentages are for the components present in that sorbent are, col. 1 ln. 60 to col. 2 ln. 8 in U. S. Pat. 5,726,117 reports that the zinc oxide is present in an amount that may range from 10 to 90 weight percent of the composition; col. 2 Ins. 35-44 in U. S. Pat. 5,726,117 reports that the colloidal metal oxide (i. e. the silica) may be present in an amount that may range from 1 to 30 weight percent of the composition; col. 2 Ins. 55-61 in U. S. Pat. 5,726,117 reports that the metal oxide may be present in the composition in an amount that may range from 5 to 95 weight percent of the composition, and col. 3 Ins. 44-54 in U. S. Pat. 5,726,117 reports that the amount of Group VIII metal oxide promoter may be present in the composition in the range of 0.1 to 20 weight percent of the composition - in a manner that is not seen to be distinct from the weight percent limitations of Applicants' claim 7.

Note that Example 1 in U. S. Pat. 5,726,117 reports that particles were removed that had mesh sizes outside of the 50 mesh (280 micrometers) to 200 mesh (74 micrometers) particle size range (i. e. particles having a size ranging from 74 to 280 micrometers were chosen), in a manner that is not seen to be distinct from the limitations of Applicants' claims 14 and 15.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that claims 9-11 set forth that the sorbent has been treated under such conditions that some zinc silicate or zinc aluminate has been formed.

Col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 reports that the metal oxide component (to include zinc silicate or zinc aluminate: please also see col. 2 Ins. 52-55 in U. S. Pat. 5,726,117) can be formed in-situ during the preparation of the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to further describe* that some zinc silicate and/or zinc titanate is formed during the method of making the sorbent described in (at least) Example 1 in U. S. Pat. 5,726,117, in the manner set forth in at least Applicants' claims 9-11, *because* the disclosure set forth in col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 fairly suggests this.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claim 17 describes the composition as having a 5 hour attrition percentage value of less than 30 percent, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is reasonably expected that the same sorbent will inherently have the same attrition resistance.

Claims 18-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,726,117 in view of U. S. Pat. 4,634,515.

Example 1 in columns 5 and 6 in U. S. Pat. 5,726,117 describes what appears to be an obvious variation of the same sorbent made by:

- mixing calcium silicate with zinc oxide in a mix-muller;
- mixing the calcium silicate/zinc oxide mixture with an aqueous solution of alumina;
- drying and calcining the resulting wet paste at 635 oC for 1 hour;
- granulating the dried, calcined to produce particles;
- mixing the particles with an aqueous solution of nickel nitrate so as to impregnate the particles with nickel nitrate;
- drying and calcining the nickel-impregnated particles 635 oC for 1 hour, and
- steam-treating the nickel-impregnated particles with steam-containing gas at 760 oC for 24 hours to produce what appears to be a steam-treated sorbent comprising zinc oxide and nickel oxide supported alumina, as set forth in at least Applicants' claims 18, 19, 22, 26-29, 32 and 33.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that claims 20 and 21 set forth that the sorbent has been treated under conditions that some zinc silicate or zinc aluminate has been formed.



Col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 reports that the metal oxide component (to include zinc silicate or zinc aluminate: please also see col. 2 Ins. 52-55 in U. S. Pat. 5,726,117) can be formed in-situ during the preparation of the sorbent.

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to further describe* that some zinc silicate and/or zinc titanate is formed during the method of making the sorbent described in (at least) Example 1 in U. S. Pat. 5,726,117, in the manner set forth in at least Applicants' claims 20 and 21, *because* the disclosure set forth in col. 2 Ins. 61-68 in U. S. Pat. 5,726,117 fairly suggests this.

The difference between the Applicants' claims and U. S. Pat. 5,726,117 is that Applicants' claim 18 step (e) requires the additional step of reducing the sorbent to provide a sorbent having a reduced-valence promoter and Applicants' claims 23, 24, 25, 30 and 31 define the promoter as nickel and define the valence of the promoter as being less than 2 or 0.

U. S. Pat. 4,634,515 is drawn to the same art of removing hydrogen sulfide out of fluids via contact with a nickel-supported-on-alumina sorbent, specifically for removing hydrogen sulfide out of naphtha that may be used for the production of high octane gasoline (please see claim 1 and col. 1 Ins. 15-18 in U. S. Pat. 4,634,515). U. S. Pat. 4,634,515 reports that a nickel-based sorbent that has been treated with hydrogen at 700 to 800 oC (please see col. 5 Ins. 4 and 5 and col. 6 Ins. 35-36 in U. S. Pat. 4,635,515) exhibits an improvement in the amount of sulfur sorbed when at least 60% of the nickel has been reduced to the metallic state (i. e. zero valence state).

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to modify* the process for making the sorbent described in U. S. Pat. 5,726,117 *by including* the reducing step taught in col. 5 Ins. 4 and 5 and col. 6 Ins. 35-36 in U. S. Pat. 5,726,117, in the manner required by Applicants' claims 18, 23, 24, 25, 30 and 31, *because* of the expected advantage of removing even more sulfur component out of the hydrocarbon fluid being treated, as fairly suggested in col. 6 Ins. 35-36 in U. S. Pat. 4,634,515.

Claims 34-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 4,634,515 in view of U. S. Pat. 5,726,117.

Examples 3 and 4 in U. S. Pat. 4,634,515 describe an obvious variation of the same method for removing hydrogen sulfide out of a hydrocarbon fluid, by:

passing a hydrogen sulfide-contaminated naptha through a bed of reduced nickel-based sorbent at a temperature of 400 oF (204 oC) and a pressure of 275 psig to produce a sulfur-laden sorbent and a desulfurized hydrocarbon fluid;

separating the desulfurized hydrocarbon fluid from the sulfur-laden sorbent (please note the passage of the hydrocarbon fluid through the "sulfur trap" illustrated in the figure shown in U. S. Pat. 4,634,515);

subjecting the sulfur-laden sorbent to a nitrogen gas containing 2% oxygen at a temperature of 750 oF (399 oC), and

subjecting the sorbent to hydrogen gas, evidently at the same temperature range of 700 to 800 oF (371 to 427 oC) mentioned in col. 5 Ins. 4 and 5 in U. S. Pat. 4,634,515

Art Unit: 1754

to produce what appears to be a regenerated sorbent ready to resume treatment of hydrogen sulfide-contaminated hydrocarbon fluids, as set forth in Applicants' claims 34, 36, 40-50, 53 and 54.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claim 34 step (a) requires the use of a sorbent having a steam-treated support (whereas there is nothing in U. S. Pat. 4,634,515 teaching or suggesting the use of a steam-treated support for the sorbent).

U. S. Pat. 5,726,117 is directed to the same art of removing hydrogen sulfide out of a fluid via contact with a zinc oxide-based sorbent, wherein col. 7 Ins. 25-33 reports that the sorbent that has been subjected to steam treatment exhibits superior sulfur loading.

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to modify* the process described in U. S. Pat. 4,634,515 *by subjecting* the sorbent to a preliminary step of steam treatment mentioned in (for example) col. 5 Ins. 47-50 in U. S. Pat. 5,726,117, in the manner required in at least Applicants' claim 34, *because* the of the expected advantage of the steam-treated sorbent to remove even more hydrogen sulfide out of the fluid being treated, as fairly suggested in col. 7 Ins. 25-33 in U. S. Pat. 5,726,117.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claims 35 and 37-39 report the presence of zinc oxide (claim 35) and/or zinc silicate (claim 38) and/or zinc titanate (claim 39).

Col. 1 ln. 64 and col. 2 lns. 61-67 in U. S. Pat. 5,726,117 reports that the hydrogen sulfide-removal sorbent comprises zinc oxide and that some of the zinc oxide may react with another component in-situ (for example, silica) to produce zinc silicate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process and composition of U. S. Pat. 4,634,515 by including the zinc components used in the sorbent of U. S. Pat. 5,726,117, in the manner required by at least Applicants' claims 35 and 37-39, because the disclosure of U. S. Pat. 5,726,117 as a whole fairly suggests superior hydrogen sulfide-removal from a fluid by using a sorbent containing zinc components and nickel components supported on alumina.

Further, note that no distinction is seen or has been shown between the weight percent limitations of Applicants' claim 37 and the weight percents of the same components reported in col. 2 lns. 2-8; lns. 37-44 and lns. 55-58 and col. 3 lns. 44-54 in U. S. Pat. 5,726,117.

The difference between the Applicants' claims and U. S. Pat. 4,634,515 is that Applicants' claims 51-54 call for the desulfurization of cracked gasoline (claim 51) or diesel (claim 52), whereas the process described in U. S. Pat. 4,634,515 treats naptha (please see claim 1 in U. S. Pat. 4,634,515) which may be used to make gasoline (please also see col. 1 lns. 17-18 in U. S. Pat. 4,634,515), *however* it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made *because* the end result of obtaining a desulfurized product (i. e. gasoline or diesel) is expected to be the same - regardless of whether or not the naptha

Art Unit: 1754

feed was desulfurized (as in the process described in U. S. Pat. 4,634,515) or the gasoline or diesel product from the naptha feed was desulfurized (as in Applicants' claims 51 and 52): please see the discussion of the *In re Burhans* 154 F.2d 690, 69 USPQ 330 (CCPA 1946) court decision set forth in section 2144.04(IV)(C) in the MPEP (8<sup>th</sup> ed.).

The following references, which are indicative of the state of the art, are made of record:

U. S. Pat. 4,045,371 disclosing a process for removing hydrogen sulfide out of a gas by using a sorbent containing a steam-treated support, and

U. S. Pat. 4,002,270 disclosing a process for removing hydrogen sulfide out of a gas with a sorbent containing a steam-treated support.

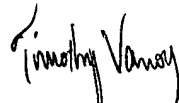
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 703-308-2540. The examiner can normally be reached on 8 hr. days.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Art Unit: 1754

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Timothy Vanoy/tv  
January 15, 2003

  
Timothy Vanoy  
Patent Examiner

Art Unit 1754